REMARKS/ARGUMENTS

Claims 1-15, 17-19, and 21-36 remain in this application. Claims 1, 3, 4, 6-15, 17, 19, 21, 22, 25-27, and 34 are amended and claims 16 and 20 are canceled without prejudice. No new matter is added by the amendments to the claims.

The drawings are objected to because "figures 3, 19, and 35-39 lack sufficient margins". Applicants submit herewith corrected drawings for FIGS. 3, 19, and 35-39 with sufficient margins. No new matter is added by the corrected drawings.

CLAIM REJECTIONS UNDER 35 U.S.C. 102(b)

Yoshino Reference

At page 2 of this Office Action, claims 1-6, 9-11, 13, 14, 19, 25, and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshino et al. (EPO 0484564A). Applicants submit that claims 1-6, 9-11, 13, 14, 19, 25, and 26 are not anticipated by Yoshino et al. because Yoshino et al. are not related to light sources or phosphors and does not disclose all of the elements of Applicants' claimed invention.

Yoshino et al. disclose a color matching method for paints based on an existing paint sample for matching. A color sample of paint, such as automobile paint, is measured by a color meter to obtain observed data (see Col. 2, lines 26-27 and Col. 3, line 51 – Col. 4, line 18). This observed data is sent to a computer device and analyzed by the same to obtain data for color matching (see Col. 2, lines 28-32 and Col. 5, lines 19-44). The color matching data is then used to meter and mix basic paints and data of actual metering of the metered and mixed basic paints are obtained (see Col. 7, lines 30-49). A test color is prepared from the metered and mixed basic paints that is measured by the color meter such that data is obtained in a similar manner as for the color sample (see Col. 7,

line 53 – Col. 8, line 30). Correction data is calculated from the actual metering and observed data of the test color to set forth the amounts of basic paints to be added to the mixture in order to produce a color that matches the color of the color sample (see Col. 8, lines 41-52). Obtaining data on the test color and correction data may be repeated to further correct the composition of the paint (see Col. 9, lines31-41).

In contrast with Yoshino et al., Applicants' invention is directed to methods of obtaining a desired mixture of light sources or phosphors not mixtures of paints as taught by Yoshino et al. For example, amended independent claim 1 recites a step of "mixing the light sources to form a working mixture, each of the light sources having an initial weight and a spectral content", amended independent claim 13 recites a step of "calculating quantities of phosphors, each of the phosphors having an initial weight and a spectral content", and amended independent claim 27 recites a step of "calculating the proportion of each phosphor to obtain the desired chromaticity, each phosphor having an initial weight and a spectral content".

Applicants' methods include steps involving light sources or phosphors not paints as taught by Yoshino et al. In one embodiment of Applicants' invention, the mixtures of light sources or phosphors may be used to obtain a desired color or chromaticity in various lamps and displays. Applicants submit that Yoshino et al. do not teach, suggest, or motivate mixtures of light sources or phosphors, or methods related to the same, that may be used in lamp or display applications.

Because independent claims 1 and 13 are clearly patentably distinguished from Yoshino et al., Applicants respectfully submit that Yoshino et al., either alone or in combination with the cited references, do not disclose nor obviate claims 1 and 13. Because of the foregoing discussion regarding the patentability of claims 1 and 13 and because claims 2-6, 9-11, 14, 19, 25 and 26

depend from one of claims 1 and 13 or an intermediate claim depending therefrom, respectively, Applicants respectfully submit that claims 2-6, 9-11, 14, 19, 25 and 26 are likewise patentably distinguished.

Snyder Reference

At page 3 of this Office Action, claims 1-11, 13-15, 19, 25, and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Snyder et al. (U.S. Patent No. 5,907,495). Applicants submit that claims 1-11, 13-15, 19, 25, and 26 are not anticipated by Snyder et al. because Snyder et al. are not related to light sources or phosphors and do not disclose all of the elements of Applicants' claimed invention.

Snyder et al. disclose a method of paint formulation for producing paint used in the automotive industry. Using a three-dimensional color space and coordinate system, a paint formulation having desired color coordinates is derived from constituent apportionments that are correlated through a regression analysis and a relational model (see Col. 1, line 60 – Col. 2, line13). A color space model is established using a selected set of paint constituents, such as binder and pigments for a known paint formulation. Parameters such as paint to binder ratios are established for formulating paint samples within the parameters. Paint samples are produced, mixed, and color analyzed.

In contrast with Snyder et al., Applicants' invention is directed to methods of obtaining a desired mixture of light sources or phosphors not paint formulations as taught by Snyder et al. Applicants' methods include steps involving light sources or phosphors not paints as taught by Snyder et al. As previously mentioned, the mixtures of light sources or phosphors in Applicants' invention may be used to obtain a desired color or chromaticity in various lamps and displays.

Applicants submit that Snyder et al. do not teach, suggest, or motivate mixtures of light sources or phosphors, or methods related to the same, that may be used in lamp or display applications.

For the foregoing reasons set forth distinguishing the present invention from Snyder et al., Applicants submit that claims 1 and 13 are patentably distinguished from Snyder et al. Because independent claims 1 and 13 are patentably distinguished from Snyder et al., Applicants respectfully submit that Snyder et al., either alone or in combination with the cited references, do not disclose nor obviate claims 1 and 13. Because of the foregoing discussion regarding the patentability of claims 1 and 13 and because claims 2-11, 14, 15, 19, 25, and 26 depend from one of claims 1 and 13 or an intermediate claim depending therefrom, respectively, Applicants respectfully submit that claims 2-11, 14, 15, 19, 25, and 26 are likewise patentably distinguished.

Sherman et al. Reference

At page 3 of this Office Action, claims 1-6, 8-11, 13, 14, 19, 22, and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Sherman et al. (U.S. Patent No. 4,887,217).

Sherman et al. disclose a method for shading paint to match the color of a standard paint when viewed dry. Components of a standard paint are mixed then shaded by addition of colorants. Quantities of components of the colorants are determined by correction factors based on tristimulus readings of wet paint and dry paints, spectrophotometer measurements, and calculating theoretical tristimulus values from the spectrophotometer measurements and the correction factors.

In contrast with Sherman et al., Applicants' invention is directed to methods of obtaining a desired mixture of light sources or phosphors not paint formulations as taught by Sherman et al. As previously mentioned, Applicants' methods include steps involving light sources or phosphors not paints as taught by Sherman et al. Th mixtures of light sources or phosphors in Applicants'

invention may be used to obtain a desired color or chromaticity in various lamps and displays. Applicants submit that Sherman et al. do not teach, suggest, or motivate mixtures of light sources or phosphors, or methods related to the same, that may be used in lamp or display applications.

Because independent claims 1 and 13 are patentably distinguished from Sherman et al., Applicants respectfully submit that Sherman et al., either alone or in combination with the cited references, do not disclose nor obviate claims 1 and 13. Because of the foregoing discussion regarding the patentability of claims 1 and 13 and because claims 2-6, 8-11, 14, 19, 22, and 23 depend from one of claims 1 and 13 or an intermediate claim depending therefrom, respectively, Applicants respectfully submit that claims 2-6, 8-11, 14, 19, 22, and 23 are likewise patentably distinguished.

CLAIM REJECTIONS UNDER 35 U.S.C. 103(a)

At page 4 of this Office Action, claims 1-6, 8-11, 13, 14, and 16-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Evanicky et al. (U.S. Patent 6,243,068) in view of Pappalardo (U.S. Patent No. 5,854,533). Applicants submit that claims 1-6, 8-11, 13, 14, and 16-36 are not obviated by Evanicky et al. in view of Pappalardo because the cited references do not disclose all the elements of Applicants' invention.

Evanicky et al. disclose light source systems for color balancing within a liquid crystal display (LCD) by manipulating color temperatures of two or more light sources for the display. Color temperatures of the light sources are selected such that the overall color temperature of the LCD varies within a predetermined range by altering driving voltages of the light sources (see Col. 3, lines 29-47). In one example, an LCD uses cold cathode fluorescent tubes as light sources and an electric circuit having dual inverters to control the brightness of light from the light sources (see

Col. 11, line 65 – Col. 12., line 52). The light sources are selected from a number of light sources having predetermined phosphor combinations to provide a desired color output at various color temperatures (see Col. 13, lines 1-8 and 44-58, and Table 1). By manually independently varying the brightness of the light sources, the color temperature of the LCD can be altered (see Col. 13, lines 20-40). For example, color balancing of the light sources is manually accomplished (see Col. 17, line 60 – Col. 18, line 14) based upon a standard black body curve when the brightness is adjusted within a predetermined color temperature range (see Col. 13, lines 1-19).

Pappalardo discloses a fluorescent lamp having a mixture of lamp phosphors where one of the phosphors is preferably a metameric blend of fluorescent halophosphor for economic advantages (see generally Col. 5, lines 26-41 and Col. 7, lines 46-57). In the context of determining a metameric phosphor blend exhibiting a target color-point and required levels of color rendering index (CRI) and lumen output, Pappalardo generally teaches to systematically identify total lamp spectral power distribution (SPD) for various combinations of four primary component SPD's (see Col. 5, line 46 – Col. 15, line 49). Then, it is determined which combinations of two metameric blend SPD's, with the same target color-point, may raise the CRI. This combination(s) is then implemented in a lamp.

Among other objects, it is an object of Applicants' invention "to allow a lamp manufacturer with little or no knowledge of optics to quickly and easily select quantities of phosphors for the manufacture of fluorescent lamps" (Applicants' Specification at paragraph 4). This object overcomes some of the general difficulties associated with producing a display having the desired optical property, such as chromaticity. In one embodiment, Applicants' invention incorporates a general normalization step where an initial weighted optical property is converged to a measured

optical property, and an adjustment step where the measured optical property is converged to a target optical property (see generally Applicants' Specification at paragraphs 9, 17, 31, 34, 39, and 42-45). The convergence of the initial weighted optical property to the measured optical property generally accounts for error that may be introduced by a measuring instrument (see Applicants' Specification at paragraphs 31 and 34).

Amended independent claim 1 recites the steps of "adjusting initial weights of the light sources until the initial weighted optical property of the working mixture converges with the measured optical property of the prototype [emphasis added]" and "adjusting the proportion of the light sources until the measured optical property of the prototype converges within the desired range [emphasis added]". Amended independent claim 13 recites the steps of "adjusting initial weights of the phosphors until the initial weighted chromaticity of the prototype converges with the measured chromaticity of the prototype [emphasis added]" and "adjusting the quantities of the phosphors until the measured chromaticity of the prototype converges within the desired range [emphasis added]". Amended independent claim 27 recites the steps of "adjusting initial weights of the phosphors until the initial weighted chromaticity of the first working mixture converges with the measured chromaticity of the first prototype [emphasis added]" and "adjusting the quantities of the phosphors until the measured chromaticity of the second prototype converges within the desired range [emphasis added]". Applicants submit that Evanicky et al. and Pappalardo, either alone or in combination, do not teach, suggest, or motivate adjusting initial weights of a light source or phosphor to converge the initial optical property of a prototype or working mixture to a measured optical property of the prototype or working mixture.

Although Evanicky et al. generally discusses phosphor mixes of the light sources, this discussion is in the context of white point balance adjustment by manually varying the brightness of the light sources (see Col. 10, lines 10-21). Nothing in Evanicky et al. teaches or suggests adjustment of quantities of sources of color that may be iteratively adjusted to converge on a desired chromaticity. At best, Evanicky et al. teaches a general selection of pre-determined phosphor mixes for light source candidates from which a combination of light sources is selected to provide a desired luminance spectrum based on a desired black body curve (see Col. 22, lines 47-51).

Additionally, while Evanicky et al. teaches selection of appropriate light sources from a pool of light source candidates based on a desired luminance and color temperature range, Evanicky et al. is not concerned with general efficiency in such selection. For example, Evanicky et al. teaches to analyze all light source candidates (see Col. 22, lines 34-41). In contrast with Evanicky et al., the present invention generally proceeds through a dual iterative convergence type process, if needed, to obtain a desired chromaticity for a light source product or lamp.

Pappalardo teaches a complex implementation where a target SPD is constructed based on component SPD's and coefficients. In general, Pappalardo seeks to provide a phosphor blend where the resulting CRI is higher than the respective individual CRI's associated with each phosphor alone. In one embodiment, the blend composition from experimental test lamps may be altered by a trial-and-error process until the SPD's of the experimental lamps converge to the target SPD (see Col. 16, line 53 – Col. 17, line3). However, Pappalardo does not teach, suggest, or motivate adjusting initial weights of a light source or phosphor to converge the initial optical property of a prototype or working mixture to a measured optical property of the prototype or working mixture. Furthermore, Applicants submit that Evanicky et al. and Pappalardo, either alone or in combination,

do not teach, suggest, or motivate determining initial weighted optical properties of the working mixture or prototype that is used for adjusting the initial weights because neither reference is concerned with errors that may be associated with the relevant measurement instrument(s).

From the foregoing discussion, Applicants respectfully submit that Evanicky in view of Pappalardo do not teach or suggest all of the steps of claims 1, 13, and 27. Because of the foregoing discussion regarding the patentability of claims 1, 13, and 27 and because claims 2-6, 8-11, 14, 16-19, 21-26, and 28-36 depend from one of claims 1, 13, and 27 or an intermediate claim depending therefrom, respectively, Applicants respectfully submit that claims 2-6, 8-11, 14, 16-19, 21-26, and 28-36 are likewise patentably distinguished.

At page 5 of this Office Action, claims 7, 12, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Evanicky (U.S. Patent 6,243,068) in view of Pappalardo (U.S. Patent No. 5,854,533) as applied to claims 1-6, 8-11, 13, 14, and 16-36 and further in view of Sun (U.S. Patent No. 6,567,751). Applicants submit that claims 7, 12 and 15 are not obviated by Evanicky et al. in view of Pappalardo and further in view of Sun because the cited references do not disclose all the elements of Applicants' invention.

Sun disclose a computer system for combinatorial synthesis, screening, and analysis of luminescent materials. A database of luminescent properties of phosphors may be generated from an assembly of sample precursors that are analyzed. Other photo-metric properties may be computed and displayed by the system based on the collected database of luminescent properties.

Applicants submit that Sun, either alone or in combination with Evanicky et al. and Pappalardo, does not teach, suggest, or motivate adjusting initial weights of a light source or phosphor to converge the initial optical property of a prototype or working mixture to a measured

optical property of the prototype or working mixture. Furthermore, Applicants submit that Evanicky et al., Pappalardo, and Sun, either alone or in combination, do not teach, suggest, or motivate determining initial weighted optical properties of the working mixture or prototype that is used for adjusting the initial weights because neither reference is concerned with errors that may be associated with the relevant measurement instrument(s).

From the foregoing discussion regarding the patentability of claims 1 and 13 and because the combination of Evanicky, Pappalardo, and Sun, does not teach or suggest all of the steps of claims 1 and 13, Applicants respectfully submit that claims 1 and 13 are patentably distinguished. Because of the foregoing discussion regarding the patentability of claims 1 and 13 and because claims 7, 12, and 15 depend from one of claims 1 and 13 or an intermediate claim depending therefrom, respectively, Applicants respectfully submit that claims 7, 12, and 15 are likewise patentably distinguished.

PRIOR ART NOT RELIED UPON

The prior art made of record and not relied upon in this Office Action has been considered by Applicants and determined not to be pertinent, particularly in light of the foregoing differences between the claimed invention and the cited references.

CONCLUSION

In view of Applicants' remarks, it is respectfully submitted that Examiner's rejections under 35 USC §§102 and 103 have been overcome. Accordingly, Applicants respectfully submit that the application is in condition for allowance, and such allowance is therefore earnestly requested. Should the Examiner have any questions or wish to further discuss this application, Applicants request that the Examiner contact the Applicants' attorneys at 480-385-5060.

If for some reason Applicants have not requested a sufficient extension and/or has not paid a sufficient fee for this response and/or for the extension necessary to prevent abandonment on this application, please consider this as a request for an extension for the required time period and/or authorization to charge Deposit Account No. 50-2091 for any fee which may be due.

Respectfully submitted,

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Dated: April 30, 2004

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APPENDIX:

Replacement Drawings